FEDERAL AVIATION ADMINISTRATION
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From: General Aviation Human Factors Program Manager, ATO-P R&D HF
To: General Aviation Human Factors TCRG, (POC: Michael Brown, AFS-840)

Subj: Aviation Safety Inspector (ASI) Training for Technically Advanced Aircraft Execution Plan

Ref: (a) General Aviation TCRG February 2nd, 2005 meeting minutes

1. Requirement Background: Recently, there has been an emergence of technically advanced aircraft, "glass cockpit", within general aviation. Aside from technical challenges presented by the design of these advanced avionics systems, there are difficulties in acquiring a conceptual understanding of the functions offered by the avionics, developing system monitoring skills and habits, developing mode management and awareness skills, understanding when and when not to use automation, and maintaining manual flying skills. Operating aircraft with advanced avionics requires an additional set of knowledge elements and skills. Currently, FAA aviation safety inspectors (ASIs) are required to inspect technically advanced aircraft, check certified flight instructors, and conduct surveillance of designated pilot examiners who are certifying pilots operating technically advanced aircraft. However, many of the aviation safety inspectors within the FAA workforce completed flight training prior to the entry of advanced avionics.

2. Project Objectives: Implement NASA Ames "Proficiency Standards for Technically Advanced Aircraft" findings into ASW-260's *Qualification* and *Evaluation* courses for technically advanced aircraft. The researcher will modify NASA Ames detailed list of awareness, knowledge and skill elements for advanced avionics to the *Qualification* and *Evaluation* course curriculums. The researcher will serve as a liaison between NASA Ames, ASW-260, AFS-840, AFS-520, and ATO-P R&D HF to ensure the proficiency standards are integrated into the course curriculums. In addition, the researcher will develop and administer a survey to measure ASIs technically advanced aircraft automation competence as well as obtain ASI feedback as to the quality of the course.

3. Research Questions to be Addressed: specific research questions to be addressed include, but are not limited to:

- What knowledge and skills do ASIs need concerning the operation of technically advanced aircraft under normal and emergency procedures?
- What are the skills that ASIs need to administer flight checks using the features of these aircraft?
- What are the skills that ASIs need concerning the display and control differences between various models of "glass cockpit" technologies?

4. Tasks and Schedule:

FY05 Second Quarter

- Kick-off meeting with ASW-260 to review the proposed *Qualification Course for Technically Advanced Aircraft* and *Evaluation Course for Technically Advanced Aircraft.*
- Obtain NASA Ames detailed list of awareness, knowledge and skill elements for advanced avionics.

FY05 Third Quarter

- Coordinate with ASW-260, AFS-520, and AFS-840 to implement NASA Ames detailed list of awareness, knowledge and skill elements for advanced avionics.

FY05 Fourth Quarter

- Provide guidance and comments to the *Qualification Course for Technically Advanced Aircraft* and *Evaluation Course for Technically Advanced Aircraft*
    - Aviation human factors training issues
    - Proficiency standards for advanced avionics

FY06 First Quarter

- Develop, test, and validate survey instrument to evaluate ASIs comments on the *Qualification Course for Technically Advanced Aircraft* and *Evaluation Course for Technically Advanced Aircraft.*
- Collect data on ASIs who completed the two courses
- Provide feedback to ASW-260, AFS-520, and AFS-840 to allow modifications of course curriculums.
- Develop and test survey instrument to evaluate ASIs competency in advanced avionics.

FY06 Second Quarter

- Validate survey instrument to evaluate ASIs competency in advanced avionics.
- Develop proficiency standards database of questionnaires to be used to evaluate pilots' awareness, knowledge and skill elements for advanced avionics.
    - Create database of awareness, knowledge and skill element questions for advanced avionics.

FY06 Third Quarter

- Develop methodology to sample questions from the database that could be used to evaluate pilots' proficiency use and knowledge of advanced

avionics. The sample will be statistically valid to ensure equal level of difficulty of questions for each sample.

FY06 Fourth Quarter

- Develop online software tool to allow examiners to download test questions for check rides.

5. Deliverables:
    1. Provide text to be included in the Qualification Course for Technically Advanced Aircraft and Evaluation Course for Technically Advanced Aircraft.
    2. Provide guidance to be included in the Qualification Course for Technically Advanced Aircraft and Evaluation Course for Technically Advanced Aircraft.
    3. Submit a report detailing results from the survey that evaluated ASIs comments on the *Qualification Course for Technically Advanced Aircraft* and *Evaluation Course for Technically Advanced Aircraft*.
    4. Submit a report detailing results from the survey that evaluated ASIs competency to advanced avionics.
    5. Submit online software tool that will allow examiners to download test questions for check rides.
    6. Monthly telephone meetings will be conducted between the investigator, ATO-P R&D HF representative, and AFS-800 representatives. The purpose of the telephone meetings will be to monitor the project's progress and to obtain sponsor feedback.
    7. Quarterly (December, March, June, and September) research progress status reports will be submitted via ATO-P R&D HF's Productivity Report website http://www.hf.faa.gov/report/.
    8. An annual report summarizing year's activities will be submitted via ATO-P R&D HF's Productivity Report website http://www.hf.faa.gov/report/.
    9. Annual five page report
    10. Program Review: investigator will participate in the annual program review.

6. AFS-800 Responsibilities
    - Make available personnel and resources to investigator
    - Implement project deliverable into Qualification Course for Technically Advanced Aircraft and Evaluation Course for Technically Advanced Aircraft.

7. Communication:
    - Monthly telephone meetings will be conducted between the investigator, ATO-P R&D HF representative, and AFS-800 representatives. The purpose of the telephone meetings will be to monitor the project's progress and to obtain sponsor feedback.
    - The researcher will meet sponsor representatives three times FY05Q4, FY06Q1, and FY06Q3. Unless directed by ATO-P R&D HF, primary location of meeting location will be FAA headquarters.

- Project POCs include: Euel Henry (ASW-260), Dan Herschler (AFS-520), Steve Casner (NASA Ames).

William K. Krebs, Ph.D.